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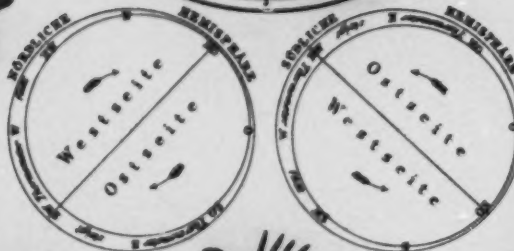
ABSTRACT

Both humanity and nature have suffered greatly from human insensitivity. Not only are the natural resources of the earth being depleted and its air, land and water polluted, the financial resources of humanity are being wasted on destructive expenditures. The "Our Only Earth" series is an integrated science, language arts, and social studies problem solving program for grades 4-12 that addresses six different global issues. The units are designed to provide students with knowledge and skills to address these major global issues actively. The unit presented in this document addresses the problems associated with the global effects of the loss of the tropical rainforests. This document includes information to assist teachers in organizing and directing students in their activities. This teacher's guide includes a unit overview, instructions on how to collect information through letter writing (including addresses for appropriate organizations), three classroom activities, a set of fact cards, instructions for a scavenger hunt, instructions for a geography activity, instructions for research and independent study, and materials for a youth summit on tropical rainforests. Additional materials included in this packet are a discussion and chart of instructional techniques and thinking skills used in the unit, a glossary of terms and a bibliography of 64 books, articles, other resources, and games on tropical deforestation. (CW)

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The Future of Our Tropical Rainforests



A CURRICULUM FOR
GLOBAL PROBLEM SOLVING.
ONE OF A SERIES.

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OUR ONLY EARTH SERIES

A CURRICULUM FOR GLOBAL PROBLEM SOLVING

The Future of Our Tropical Rainforests



An integrated curriculum that explores real life issues, culminating with a SUMMIT where students seek solutions to global problems and create action plans. This versatile program is ideal for grades 4th–12th, or as a format for community and regional forums.

Our Troubled Skies

The Future of Our Tropical Rainforests

Our Divided World: Poverty, Hunger & Overpopulation

War: The Global Battlefield

Endangered Species: Their Struggle to Survive

The Ocean Crisis

By MICKI McKISSON and LINDA MacRAE-CAMPBELL

OUR ONLY EARTH

A CURRICULUM FOR GLOBAL PROBLEM SOLVING

The Future of Our Tropical Rainforests

- One in a Series of Six Non-Sequential Units
- For Grades 4-12 • Small or Large Groups
- One Month to One Year Course of Study
- Each Unit Follows the Same Format

Our Troubled Skies
The Future of Our Tropical Rainforests
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Endangered Species: Their Struggle to Survive
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The Ocean Crisis

Zephyr Press • Tucson, Arizona

By MICKI McKISSON and LINDA MacRAE-CAMPBELL

**Dedicated to Our Common Mother—
Our Beloved and Only Earth**

"... The earth does not belong to man: man belongs to the earth. This we know: all things are connected. Whatever befalls the earth, befalls the sons of the earth. Man did not weave the web of life. He is merely a strand in it. Whatever he does to the web, he does to himself."

Chief Noah Sealh, 1854

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Note: Every *teacher information* section gives an explanation to the corresponding reproducible student activity.

Our Only Earth Series

The Chinese ideograph for the word *crisis* is made up of two words: danger and opportunity. Currently, there are many threatening global issues and diverse opinions as to how to address them. For example, Noel Brown, director of the United Nations Environmental Program, urges immediate action, stating that the earth has approximately 4000 days before it is irreparably polluted. Another view, held by physicist and author F. David Peat, states that individuals need to learn to think systemically and reflectively before taking action.

It should be noted that the intent of the *Our Only Earth* materials is to provide students with knowledge and skills to actively address major global issues. We feel that exciting opportunities exist for resolving pressing social and environmental problems when students are educated about real-life issues, have the tools to address them, and have the desire to act to improve the lives of others and the health of the planet.

Humanity and the environment have suffered greatly from our own insensitivity. To insure our survival and the survival of all forms of life, it is necessary to establish an ethical relationship with others and the planet we share.

Our Only Earth is an integrated science, language arts, and social studies problem-solving program consisting of eight classroom activities. Each of the units in the series follows the same format. These activities can extend from one month of study to an on-going year-long process. Students enthusiastically embrace the lessons because the instructional strategies are so varied and appeal to learners of all ages and types.

Students enjoy the *Our Only Earth* series also because real-life issues are addressed and solutions proposed. This program provides information which is aimed at strengthening students' skills, enabling them to contribute positively to their world.

Introduction

Both humanity and Mother Earth have suffered greatly from human insensitivity. Not only are we rapidly depleting the planet's resources and polluting its air, land, and water, we also waste our financial resources on destructive expenditures. Current global trends reveal the unhealthiness of our planet and our priorities:

- According to Dr. Norman Myers, one species a day is becoming extinct. This rate is expected to accelerate to one species every 15 minutes by the year 2000.
- Myers also states that every year 40 million people die from starvation and hunger-related diseases, half of them children. This is equivalent to more than 300 jumbo jet crashes every day.
- Tropical rain forests comprise only 8% of the earth's surface but contain 40% to 50% of all known species of life. Tropical forests play an important role in regulating global climate and provide an abundance of resources to all of humanity. Yet, according to Walter Corson, if present trends continue, most of the world's tropical forests will be gone by the year 2000.
- Scientists predict that various forms of air pollution may cause global temperatures to rise, the oceans to expand and flood coastal lowlands, interrupting natural food chains, and cause widespread skin cancer among humans.
- According to Lester Brown, in 1988 the world spent more than \$100 million each hour on global military expenditures.
- A 1988 article in *Nature Scope* explains that every year fourteen billion pounds of trash are dumped into the oceans. Oil spills, industrial waste, agricultural chemicals, and human pollution relentlessly choke our oceans and marine life.

These statistics are frightening and depressing. When we first began to develop this global education program, we were shocked at the dilapidating state of our planet. We grew apprehensive over the increasing potential for devastation were these problems allowed to escalate. All in all, the prospects seemed dim. Yet, in watching students tackle these monumental global issues—overwhelming to us—our hope was restored. Students, fourth through twelfth grade, once acquainted with this program, developed solid action plans addressing the major global challenges of today.

A few of the students' recent solutions include:

- creating an Animal Congress for animal rights.
- drafting the *Youth Declaration for the Future* which requests that governmental priority be given to global issues
- writing letters protesting deforestation
- adopting a humpback whale
- developing church, school, and community forums
- writing letters to newspapers about global concerns
- picking up litter at parks and beaches

Our fears were quelled by hope as students grew confident in their ability to make a difference in their world, for their world. A seventh grade girl named Emma Wilson stated:

"These problems have been left to us. We are the ones who will make a difference. We are the future and we do care."

Your students will also gain knowledge about a particular area of global concern; they will learn a problem-solving process that addresses an issue of great magnitude and ideally, they will be roused to action. The legacy of a polluted environment with crippling social problems will be inherited by our students, who, with help from the *Our Only Earth* series, will gain the knowledge, skills, and hopefully, the desire to appropriately care for our Earth. All kingdoms of life will benefit.

Note: Sources for the facts mentioned on the previous page can be found in the bibliography.

Various Instructional Techniques

Not only are the global topics timely and important, but they will incite enthusiasm in your students. The activities, developed by award-winning teachers and field-tested by elementary and secondary students, are first and foremost FUN! Students will enjoy the dynamic and varied learning activities. You, as the instructor, will appreciate the care and thoroughness that went into the preparation of these lessons for use in your classroom.

A variety of instructional strategies are used in classroom activities in order to appeal to all types of learners. Several concrete and experiential learning processes engage the bodies, minds, and feelings of students. Kinesthetic, visual, and auditory functions are stimulated to maximize the learning potential of each student. The lessons provide opportunities for them to work independently as well as cooperatively in small and large groups. Critical and creative thinking skills are incorporated into the activities to engage students in higher levels of thinking. A creative problem-solving strategy is implemented to help students approach the issues at hand. The chart on the following page depicts the variety of instructional strategies and higher level thinking skills which are included in *Our Only Earth* activities.

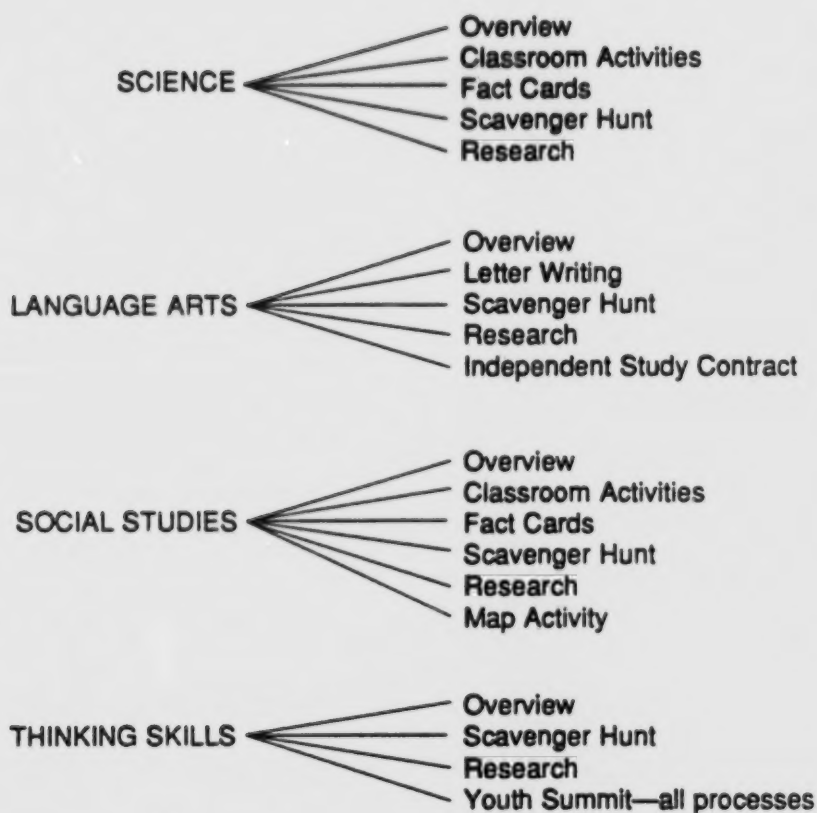
INSTRUCTIONAL STRATEGIES & THINKING SKILLS IN OUR ONLY EARTH

Introduction

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	Overview	Letter Writing	Classroom Activities	Accelerated, Cooperative Learning: Nothing but the Facts	Scavenger Hunt	Where in the World Map Activity	Self-Directed Learning	Global Problem Solving: The Summit
Learning-to-Learn Skills	X	X			X	X	X	X
Memory Skills	X			X				X
Kinesthetic Activities			X	X	X		X	X
Visual Activities	X		X	X	X	X	X	X
Creative Thinking Skills	X		X	X	X		X	X
Critical Thinking Skills	X	X	X	X	X	X	X	X
Problem Solving		X		X	X	X	X	X
Cooperative Learning	X			X	X	X		X
Research Skills	X	X	X	X	X	X	X	X
Communication Skills	X	X		X	X	X	X	X
Engaging Feelings	X		X					X

In addition to a variety of instructional strategies, the enclosed lessons also provide an integrated learning experience which incorporates science, language arts, social studies, and thinking skills. The following chart shows the integration between subject matter and lessons and activities of *Our Only Earth*:



The Sequence of Our Only Earth

Our Only Earth has been carefully structured for both the student and the teacher. Study of the global problem begins with a brief survey, followed by in-depth information and independent research, culminating with a problem-solving process where students conduct their own Youth Summit. At the Summit, the students search for solutions and create action plans to approach the global issues.

In the Teacher's Guide, you'll note explanations for each student activity. The lessons in *Our Only Earth* are intended to be used as guidelines. Your creativity is encouraged, so please use these materials as a springboard for developing your own classroom activities.

The Overview

The students begin with an Overview of the issue. The Overview serves as a quick appraisal of the global issue and discloses important facts as to WHY this topic is worthy of study. Since the Overview shares poignant information, the students often become emotionally engaged in the topic. If students feel overwhelmed or fearful, as we initially did, reinforce the point of studying this issue—to improve environmental or social conditions. To do this, it is necessary to be informed.

Letter Writing

Next, students will write letters to organizations requesting information about the particular global problem at hand. This activity serves two main purposes: to introduce students to formal letter writing, and to provide them with up-to-date information on the topic.

Classroom Activities

Students, as a class, will then have hands-on experience to personally explore aspects of the global issue. Because of the experiential nature of these activities, the students should be motivated to study further for the next activity.

Nothing But The Facts!

This is a cooperative and accelerated learning activity that teaches facts and information about global problems. Students are divided into small groups. Everyone receives a fact card and teaches the three facts on the card to their group. Next, the group prepares a dynamic mini-presentation to teach their facts to the whole class. When this lesson is complete, the students will have learned a wealth of information about their global challenge.

Scavenger Hunt

Prepare for your students to go wild with excitement over this activity! The students will be gathering additional information on their topic through a scavenger hunt method. Again, the students will work in small groups and then share the data they have gathered with the whole class.

Where In The World.....?

This is an enjoyable map activity. Students locate acute problem spots on a world map, pinpoint the coordinates, and identify the regional areas involved.

Research and Independent Study Contract

Now that your students have gathered an abundance of information, they are ready to identify one aspect of the problem and pursue it through independent research. To help facilitate this individualized

research, each student will complete a contract. You will then be able to log each student's progress, as well as help your class move towards the most valuable type of educational experience—self-directed learning.

The Youth Summit

Here the students will actively meet in groups to share what they have learned, to decide upon a specific problem they want to solve, and to create a plan of action. This problem-solving process is the highlight of the entire unit. At the Summit, students are asked to make positive contributions to the world. Activating the students' plans may, for some, take a short period of time, or in other cases, depending on the particular commitment, may take longer.

As your students progress through *Our Only Earth*, you will undoubtedly notice many significant attitude changes. They grow aware of the delicate global environment we live in. They develop a sense of responsibility towards others. Often there is a commitment to become a caretaker for the planet. Here is what some students have to say after participating in *Our Only Earth* Programs:

"We are the ones doing this to ourselves and we can learn to stop."

Sue Ann Martin, age 11

"I learned that I am not the only one out there who cares and that I have something to do for this polluted but wonderful world."

Misty Vichitnand, age 12

"After studying these problems, I learned to be more caring for the world. I see that we can be world changers."

Jason Schmidt, age 9

Note: As you photocopy activities for your students, remember that copier paper can be recycled too!

1 The Overview

Suggested Activities for the Tropical Rainforest Overview

(approximate time: 1 hour)

The Overview contains interesting information on your global challenge and will ready students for more in-depth information. The intent of the Overview is to provide your class with a quick survey of the main issues while piquing their curiosity and their desire to learn more.

One way to introduce students to the Overview is to first have them quickly brainstorm what they already know about the topic. They can do this individually or as a group. You may want to list or chart their information on the blackboard. Another option would be to list the information on an overhead sheet or on a piece of butcher paper so that students can refer back to their original suggestions and then add new information when needed.

Copies of the Overview are distributed after the discussion. Suggest your class read silently through the material once to pick up general information. For the second reading, have students note at least three facts that are particularly interesting to them. Ask the students to prepare to teach these three facts to a small group of students or to the whole class. Suggest they make visuals, a riddle, or a short poem to help teach the others. Give the students about fifteen minutes to prepare.

After the students have shared their three facts, ask the class for additional questions they might have about the global issue. You may want to suggest they consider questions asking **who, what, where, when, why and how**. As the students begin to share their questions, you may want to list them on the board or on a piece of butcher paper for future reference. Later, as the students progress through their studies, they may want to note answers they have found to their questions.

Overview of the Issue

Resting between the Tropic of Cancer and the Tropic of Capricorn is one of nature's greatest celebrations—the tropical rainforests. The world's rainforests extend from the steamy jungles of Central and South America through the belly of Africa, onto exotic Madagascar, reaching up into India and Southeast Asia. It thickens downward until it blankets nearly all of Indonesia and finally rests at the top of Australia. The rainforests form a 3000 mile wide green band around the equator and cover approximately 8% of the earth's surface. Despite its relatively small size, the lush tapestry of the moist rainforests provide a home for 40 to 50% of Earth's living organisms.

Much of what we know about the world's rainforests is shrouded in mystery. Five million species of plants, insects and animals live in the rainforests. Only one-fourth of these have been identified and even a fewer number have been studied. One of the oldest communities on Earth, the rainforests have evolved over the past sixty million years creating diverse and rare life-forms. To illustrate this diversity, the tropical rainforests contain anywhere from 20 to 86 different species of trees per acre. In comparison, one acre of a temperate forest contains only four different species of trees. Eighty percent of the world's insects live in tropical rainforests. Sadly, many species have yet to be discovered and may even disappear before becoming known to humans.

Tropical rainforests are a rich world resource. They not only provide timber but also a variety of products used in industry including latex, camphor, dyes, resins, oils and lubricants. Staple foods, such as rice, yams, sugarcane, pineapples and bananas are harvested from the rainforests. Tropical rainforests provide more drug yielding plants for medicine than any other ecosystem in the world. Madagascar periwinkle gives children who suffer from leukemia a 99% chance of overcoming the disease. Potential new medicines exist in the countless unnamed species of plants and animals. Perhaps a cure for AIDS or cancer will be discovered in the rainforests.

Due to deforestation, it is estimated that less than half of the

original tropical forests remain. Millions of tropical forests are destroyed each year. As the forests disappear so do the plants, insects and animals. Everyday, it's estimated that as many as 48 tropical forest species are lost forever.

There are several reasons why the rainforests are disappearing. For one, many tropical countries have increasing national debts and inflation. Governments promote logging to obtain foreign exchange to pay these huge debts. Widespread poverty, high unemployment rates and rapid population growth add pressure to exploit the remaining tropical rainforests. Affluent nations, with their increasing demands for rainforest products, also contribute to the problem.

There are many causes of tropical deforestation: the main reasons are listed below:

- **TIMBER CUTTING:** Commerical logging is a major cause of forest destruction. Modern logging can clear three to four acres in just two hours.
- **CATTLE RANCHING:** Tropical rainforests are destroyed to make grazing land for cattle. The beef is then sold for export.
- **SHIFTING CULTIVATION:** The soil in the tropical rainforests contains few nutrients. For years, farmers practiced shifting cultivation—clearing a plot, growing crops for a short period, then moving on to a new site. When the population was smaller, this seemed a viable form of agriculture. However, with the increase in the number of people farming in that area, the soil has become overused and is therefore no longer viable.
- **FUELWOOD GATHERING:** One third of the human population depends on firewood as its primary energy source. The gathering of firewood contributes to deforestation.
- **RESETTLEMENT PROGRAMS:** With growing populations in the tropical countries, some governments are encouraging its people to carve out a living in the forests. Forests are cleared for farming, the building of roads and agricultural development.

Deforestation leads to many problems. These include floods, droughts, and the formation of deserts. These are direct results of the land and soil being destroyed. Plants and animals are rapidly becoming extinct and homelands for many tribal people are being lost. Deforestation also limits the amount of medicines and agricultural products available. Scientists fear that continued destruction of these rainforests could alter the climate, not only locally, but on a worldwide scale. The massive burning of tropical rainforests also contributes to the pollution of our atmosphere. These activities, combined with other human activities such as the burning of fossil fuels, add greenhouse gases to the atmosphere which could result in global warming of the Earth.

Although each rainforest is as different as the country where it's located, all have one thing in common: they are disappearing faster than they are being replanted. Wastelands, deserts and a deafening silence may become the burial grounds for lost species.

It is predicted that the accelerating destruction of the world's tropical rainforests will be one of the most profound ecological problems in the twenty-first century. Nations and individuals must search for solutions to preserve and properly manage the remaining tropical rainforests. Their survival is crucial to the well-being of the entire planet.

2 Letter Writing

Writing to Organizations for Information

(approximate time: 1 hour)

In order to gather current information on the global challenge, you will want to initiate a letter-writing activity to various organizations at the beginning of the unit. It often takes four to six weeks to receive information. However, the wait is well worth it, as the materials will provide relevant and up-to-date information. For a quicker response, depending upon your locality, you can also call organizations and ask them to send information.

To introduce this letter-writing activity, ask the class to consider questions they have about the issue at hand. Explain that writing letters to public and private organizations is an effective way of gathering information on a topic where data is continually changing.

Begin by providing students with copies of "Organizations to Write to for Information." Brainstorm with them about what elements to include in a letter that requests information. Assign groups, pairs, or individual students, to contact an organization. You may want to suggest that they create an outline before writing. It's important for students to be specific in their requests for materials. Depending upon the age and ability level of your students, you may wish to format a sample letter.

Expect an abundance of information from these organizations.

Organizations to Write to for Information on Tropical Deforestation

ENVIRONMENTAL DEFENSE FUND
257 Park Avenue, S.
New York, NY 10010
(212) 505-2100

GLOBAL TOMORROW COALITION
1325 G Street, N.W., Suite 915
Washington, DC 20005-3104
(202) 628-4016

GREENPEACE USA
1436 U Street, N.W.
Washington, DC 20009
(202) 462-1177

NATURAL RESOURCES DEFENSE COUNCIL
40 W. 20th Street
New York, NY 10168
(212) 949-0049

RAINFOREST ACTION NETWORK
301 Broadway, Suite A
San Francisco, CA 94133
(415) 398-4404

WORLD RESOURCES INSTITUTE
1709 New York Avenue, N.W., Suite 700
Washington, DC 20006
(202) 638-6300

Note: Because these organizations may move before our annual Spring update, please see the *Encyclopedia of Associations* for the most current addresses.

3 Classroom Activities:

Understanding the Problems of Deforestation

The following activities are designed to increase students' awareness regarding the richness and uniqueness of the tropical rainforests and their value as a world resource.

1. What Are the Characteristics of a Tropical Rainforest?

Before beginning the following activity, it would be beneficial to show the students a film or videotape on tropical rainforests or pictures from books such as Catherine Caufield's *In the Rainforest* or Norman Myer's *The Primary Source*. This will help provide your class with some background information on the tropical forests.

Divide students into groups of three. Provide each group with a large piece of butcher paper and colored marking pens. On the board write TROPICAL RAINFOREST with a circle around it. Have groups do the same thing on the butcherpaper. Ask students to sit back and think about the tropical rainforest—guide students by asking them what they hear, see, feel, and smell.

Direct each group to brainstorm as many words as possible that describe the tropical rainforest. Encourage students to include the names of insects, birds, mammals, trees and plants found in the tropical rainforests. Students should record their ideas in "clusters" on the butcher paper. Allow time for group discussion. Encourage groups to add to their clusters as new ideas are communicated.

Allow ten to fifteen minutes for students to write a descriptive piece about the tropical rainforest. This writing may take the form of a poem, haiku, essay, story, etc. Students may want to write from the

perspective of one of the many creatures that live in the forest or even from the point of view of the forest itself. For those who would prefer to work visually, a drawing of an animal or tree or other part of the forest may be appropriate. Allow time for student sharing.

2. Have You Read *The Lorax* by Dr. Seuss?

Read to students, *The Lorax* by Dr. Seuss. This is a story about what happens when people misuse the forest. It illustrates the potentially devastating effects of massive deforestation. After reading the story, engage students in a discussion. The following questions might be helpful:

- What is the message behind the story?
- How does this message relate to what is currently happening to the world's tropical rainforests?

Conclude by asking students to list **why** the tropical forests are disappearing at such a rapid rate. Record their responses on the board or a piece of butcher paper. Causes of deforestation should include: cattle ranching, commercial logging, road building, large-scale agricultural projects, resettlement programs, open-pit mining, and hydroelectric projects.

3. How Do We Benefit From the Rainforests?

Provide each student with a piece of construction paper and glue. Have a stack of newspapers and/or magazines that feature a variety of colorful pictures.

List the following categories on the board: **Food products**, **Medicines**, and **Miscellaneous products**. Explain to the students that these provide a few examples of the wealth of resources imported from the tropical rainforests. Next, add the following information to the three lists: food products include: bananas, coffee, yams, Brazil nuts, tea, rice, millet, etc. Medicines include: painkillers, muscle relaxants, tumor inhibitors, heart and respiratory stimulants, anti-leukemia drugs and others. The miscellaneous category includes: wood products, dyes, oils, paperpulp, pesticides, gums, perfumes, etc.

Once several items are listed under each category, have students make collages that display some of the products we get from the tropical rainforests. Ask the students to title their collages and then display them in the classroom.

4 Fact Cards

Cooperative Learning With Fact Cards

On the following pages you will find fact cards about your global issue. What follows is a description of a cooperative learning activity that will, in one or two hours, introduce your students to a number of facts. Not only will the students cooperatively learn from each other, they will be exposed to a vast amount of material from this activity.

You will note that there are four categories of fact cards, each category with a total of eight cards, 32 in all. Divide your class into four groups of approximately eight students in each, or if you'd rather, divide them into approximately eight groups of four students each. Each group is then assigned one of the four categories to study.

After the categories are assigned and the student groups are physically arranged, each group then receives cards from one of the four categories. Each student takes one card which contains three facts. Students are then responsible for completing the following activities:

- Read the three facts on the cards. (approx. 5 minutes)
- Teach group members their three facts. (approx. 5-10 minutes)
- Learn the facts from the other group members. (approx. 5-10 minutes)
- Decide, as a group, on 8-14 facts to teach the rest of the class by preparing a class presentation. (approx. 20-30 minutes)
- Teach the group's facts to the other groups in the classroom so that all may learn from each other. (approx. 30-60 minutes)

When the students are teaching their facts to their own group and then to the rest of the class, they should be encouraged to be creative and interesting in their instruction. Inform the students that they can teach with the following methods:

- visuals, charts, diagrams
- poems, songs, or stories
- role play, games, or skits
- question-and-answer or riddle formats
- charades
- invent their own creative teaching strategies

Suggest to the students that they teach in ways that enable others to really learn the information, not just listen and forget!

When students are placed into their groups, some may wish to study another category. You can explain that when the activity is completed, everyone in the class will have learned about ALL of the topics. So even if they don't have their first choice, they will still have an opportunity to learn what interests them.

Age and Class Size Adjustment

It is easy to adjust the fact card activity to fit a variety of age groups as well as a larger or smaller number of students. For fourth through sixth grade students, you may want to have them learn only one or two facts per card, then each group could teach fewer facts to the entire class. If you have fewer than 32 students, ask for volunteers who are willing to learn more than one card.

Evaluation of the Activity

Evaluation can occur in a variety of ways throughout this activity. Observing how students teach one another will indicate what was learned individually. Having the students list, draw, or reenact what they gleaned from their classmates will also demonstrate their knowledge. At the end of the presentations, you may want to ask students to list on paper at least ten facts they have learned.

Nothing but the Facts

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Approximately 8% of the earth's land surface is tropical rainforest. The rainforests form a green band around the equator.
2. Rainforests are the richest regions on earth in terms of their diversity of life. The tropical rainforests house 40 to 50% of the world's plant and animal species.
3. One-half of all growing wood on earth is located in the tropical rainforests.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Up to two hundred different types of trees can be found growing in 2.5 acres of tropical rainforest.
2. The intricate plant systems found in tropical rainforests support a great diversity of insect and animal life.
3. Tropical rainforests remain a mystery to us—scientists have identified less than 20% of all the species which live there.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Leaves of trees and other plants are the most important "chemical factories" in the world. They provide oxygen and food for humans and animals.
2. The process of photosynthesis consists of sunlight giving leaves energy to form simple sugars by combining carbon dioxide from the air with water from the roots.
3. Humans and animals exhale carbon dioxide which trees and plants depend on for survival. An inter-dependent process exists between plants, trees and humans and animals. The rainforests contribute to the basic processes that make life possible on earth.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Rainforests serve many important functions. They capture, store, and recycle rain which prevents floods, droughts and erosion of the soil.
2. Forests act as major gene pools on earth, accounting for the emergence of many new species. They also recycle nutrients.
3. The rainforests also play important roles in regulating local and global weather. The destruction of rainforests may cause alterations in world climates.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Tropical rainforests benefit humankind in many ways. They provide more drug-yielding plants for medicine than any other ecosystem.
2. Tropical rainforests enhance agriculture. Some rainforest fruits and vegetables when crossed with modern strains produce a higher quality product.
3. Tropical rainforests yield many well known foods such as yams, bananas, rice, millet and others.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Once a forest is cleared, minerals wash deep into the soil or beyond the reach of plants and shrubs, breaking the rainforest's nutrient cycle.
2. Once trees are removed, the exposed ground bakes in the hot tropical sun and becomes as hard as concrete. Deforestation, thus, increases drought problems.
3. When a forest has been cleared, and the tropical rains hit, there is massive water runoff and erosion. Increased flooding is caused by deforestation.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. When a tropical forest is repeatedly cleared, the land loses its productivity and supports only the growth of coarse grasses and troublesome weeds.
2. The tropical forests are being destroyed by cattle ranching, logging, road building, industry and relocating peasants who move to the forests.
3. When a tropical forest is cleared, it takes 400 years to regrow if the soil is not permanently damaged.

TROPICAL RAINFORESTS GENERAL INFORMATION:

1. Tropical forests help us control pests that destroy nearly 40% of our domestic crops. We use the chemicals from plants that have developed ways to repel insects.
2. Tropical forests also give us beneficial insects that control pests which destroy domestic crops. Florida saves about \$30 million a year after spending \$35,000 for importing parasitic wasps.
3. Tropical rainforests are home to many tribal people who have learned how to live in harmony with the forests.

TROPICAL RAINFORESTS GEOGRAPHY:

1. Tropical rainforests grow near the equator in approximately a 3000 mile wide band around the earth.
2. The largest tropical rainforests are located in the Amazon River Basin of South America, the Congo River Basin of Africa and throughout much of southeast Asia.
3. Smaller rainforests are located in Madagascar, Australia, Central America, Costa Rica, India and elsewhere.

TROPICAL RAINFORESTS GEOGRAPHY:

1. Tropical forests have great ecological richness. For example, southeast Asia has 297 species of land animals and 732 kinds of birds while Europe, an area four times as large, only has 134 species of land animals and 298 bird species.
2. The Malay Peninsula alone has 7900 plant species, while Great Britain, an area nearly twice as large, has only 1430 species.
3. The rainforests of Latin America provide winter habitat for migratory birds from the U.S. However, as the tropical habitats are being destroyed, the migrant species are also dying out.

TROPICAL RAINFORESTS GEOGRAPHY:

1. At the present rate of deforestation, virtually all of the forests of West Africa, south-east Asia and Central America will be destroyed by the year 2000.
2. Each year an area of tropical rainforest the size of Indiana is destroyed.
3. Large areas of tropical forests in Columbia, Peru and Brazil could be eliminated by the year 2000.

TROPICAL RAINFORESTS GEOGRAPHY:

1. Deforestation has been more rapid in some areas than others. Costa Rica lost 1/3 of its forest in ten years.
2. Similar losses of large portions of tropical forests have occurred in Thailand, the Ivory Coast and the Phillipines.
3. Clearing land for crops and livestock destroys over 12,000 miles of Brazilian rainforest each year. This is an area larger than the country of Belgium.

TROPICAL RAINFORESTS GEOGRAPHY:

1. The Penans of Borneo depend completely on the forest for their livelihood. Their survival is threatened by the Malaysian logging industry.
2. Logging activities are causing massive erosion, flooding, pollution of watersheds, and extinction of plant and animal species.
3. The Penan are now facing starvation and disease since fishing waters are polluted, and food and medicine sources are scarce.

TROPICAL RAINFORESTS GEOGRAPHY:

1. Native Indians in the Brazilian rainforests are losing their way of life because of deforestation.
2. Some of the Brazilian Indians are nicknamed rubber-trappers because of their ability to harvest rubber from tropical trees without damaging them.
3. The rubber trappers and the newly arrived ranchers who clear the rainforest have had some violent confrontations. The Indians want to preserve their way of life. One Indian leader, Chico Mendez, was shot as he tried to save the rainforest and his way of life.

TROPICAL RAINFORESTS GEOGRAPHY:

1. Many tropical countries export their timber and in doing so, seriously deplete their rainforests.
2. Malaysia exports 53% of all tropical lumber. Indonesia exports another 31%.
3. Wood from southeast Asia often is sold to Japan. Wood from Africa goes to Europe, and Latin America exports to North America and Europe.

TROPICAL RAINFORESTS GEOGRAPHY:

1. The largest buyers or importers of tropical woods are Japan, the United States and the European community.
2. The U.S. imports plywood and paneling from southeast Asia and also buys Brazilian mahogany. The U.S. buys 70% of all tropical hardwood, plywood and veneer.
3. Japan buys 80% of the timber exported from Sarawak in Malaysia. Japan's demand for timber has also led to deforested areas in Thailand, Indonesia, Papua, New Guinea and the Phillipines.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. Tropical farmers used to clear a small plot, grow crops for a short period, then move onto a new site. Larger populations and an increase in clearing forests no longer make "shifting cultivation" a viable form of agriculture.
2. "Shifting cultivation" is responsible for 70% of the deforestation in Africa, 50% in Asia, and 35% in Central and South America.
3. More than 11,000 square miles of forest in the Amazon area of Brazil was converted into agricultural land, incapable of sustaining intensive agriculture. Today this land is a vast wasteland of coarse grass and shrubs.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. Commercial timber industry is a major cause of deforestation in Asia, Africa and the Amazon. Commercial timber cutting can clear several acres in two hours.
2. Only 12 square miles of forest are replanted each year in the Ivory Coast of Africa, yet, over two thousand square miles of forest are logged yearly.
3. According to the World Bank, at least 12.5 million acres of rainforest are destroyed by commercial loggers each year. Developing countries, facing large debts, export timber as a way to earn foreign exchange.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. Rainforests are being cleared for cattle ranching to provide beef for the export market. One thousand pounds of forest life per acre is destroyed for every hamburger produced in Central America.
2. Between 1961 and 1978, forty percent of the tropical forests in Central America were destroyed while grazing land more than doubled.
3. In Central America, the land can sustain cattle ranching for only 5 to 7 years before it is unable to support life and becomes consumed by weeds.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. Large agricultural projects which export bananas and coffee add to the problem of deforestation when they are not managed properly.
2. Government sponsored agricultural resettlement programs, like the Transmigration Project in Indonesia and Brazil, cause massive deforestation. In response to a population crisis in major cities, Brazil and Indonesia are moving thousands of families into the forest.
3. Thousands of miles of forest are being destroyed by people migrating into them. The forests are replaced by agriculture that gives low yields and is only productive for a short period of time.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. As rural populations grow, the need for fuelwood increases and deforestation often results. Village people in parts of Africa and Asia have depleted their fuelwood supply.
2. Fuelwood is scarce in at least 27 countries (18 of which are African) and it is seriously depleted in 42 countries (20 being African).
3. Deforestation is also caused by the demands of wealthy countries for timber and other agricultural products.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. Lack of protective regulations for public lands in many developing countries add to deforestation. In India, firewood is illegally cut from forest reserves to be sold in the cities.
2. Multilateral Development Banks (MDB's) loan about 22 billion dollars each year to "third world" development. Two MDB's, The World Bank and the Inter-American Development Bank promote large scale agricultural and cattle ranching projects so that developing countries can export goods to pay their foreign debts.
3. Selling off forest products results in a short term solution because only a little of the money is used to replace the trees.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. The destruction of the rainforests has a variety of negative effects on other lifeforms. As the forests die, so do many of their plants and animals.
2. Giant otters, jaguars, and the woolly spider monkey are becoming increasingly rare due to the destruction of their habitat.
3. Scientists fear that the rampant destruction of the forests will result in agricultural devastation within the first decade of the 21st century, similar to what happened in Ethiopia and Haiti during this century.

TROPICAL RAINFORESTS CAUSES OF DEFORESTATION:

1. Other negative consequences of deforestation are climate and land alteration. When tropical forests are clear-cut, the carbon atoms from the vegetation are released into the atmosphere. This results in increased amounts of carbon dioxide which contributes to the "greenhouse effect" and may cause the earth's temperatures to rise.
2. The widespread destruction of tropical forests could change the climate throughout the world, according to many scientists. Rainfall near the equator and in the northern temperate regions, including the breadbaskets of the United States and Canada, could dramatically decrease.
3. The majority of soil in the tropics is unsuitable for agriculture. The forests protect the topsoil by building reserves of minerals above ground in the vegetation. Deforestation robs the soil of its protective covering and is washed away by rains and strong winds. This results in "human-made" deserts.

TROPICAL DEFORESTATION SOLUTIONS:

1. It is essential that tropical forest lands be preserved to ensure the survival of their biological communities. Leading scientists and citizens worldwide are proposing the preservation of tropical forests.
2. The following organizations are active in encouraging preservation worldwide: Man and the Biosphere Program and the World Heritage Program, both coordinated by the United Nations Educational, Scientific, and Cultural Organization (UNESCO); The World Wildlife Fund, International Union for the Conservation of Nature, and U.S. Agency for International Development.
3. Scientists from the Soviet Union and the United States issued a joint statement released by the Environmental Policy Institute to save the tropical rainforests. The scientists seek U.S./Soviet cooperation to halt massive deforestation.

TROPICAL DEFORESTATION SOLUTIONS:

1. Individuals can do many things to help limit deforestation. People can refuse to buy tropical wood products such as teak or mahogany furniture. Carpenters and builders can refuse to buy rainforest timber. People can also refuse to use wood chopsticks made of tropical timber.
2. Individuals can refuse to eat fast food hamburgers or processed beef products since the U.S. imports tropical beef for its food industry.
3. For two years, U.S., Costa Rican, and other Central American environmentalists boycotted Burger King, who bought 70,000 head of steer a year from Costa Rica alone, accounting for 70% of the country's beef exports. In September of 1987, Burger King, one of America's largest fast-food chains, promised that they would no longer buy rainforest beef.

TROPICAL DEFORESTATION SOLUTIONS:

1. The Lua tribe of Thailand have practiced "agroforestry" for years. Agroforestry is a land-use system in which trees and crops are grown alongside each other.
2. Agroforestry has been practiced successfully for centuries and works well for long term productivity of soils unsuitable for intensive cultivation.
3. Agroforestry maintains the forest as a self-renewing resource and can be a feasible alternative to the use of "shifting cultivation" currently practiced in many Central and South American countries.

TROPICAL DEFORESTATION SOLUTIONS:

1. An energy-saving technology was introduced in Ethiopia in 1986—mud stoves. The stoves are made of mud and straw and use less wood and are three times more efficient than traditional methods of cooking over an open fire. This practice can benefit other nations.
2. In Ethiopia, homes are being built out of hollow mud blocks using 60 to 70 percent less wood.
3. Tree plantations can be made where forests have been logged. These plantations could provide a new source of timber, removing the pressure on existing virgin forests. The Ivory Coast currently has a plantation of obeche trees, a fast-growing indigenous hardwood.

TROPICAL DEFORESTATION SOLUTIONS:

1. Tropical forests have been exploited for economic gain. Governments throughout the world must work together to inspect and control commercial logging operations. Replanting should also equal the number of trees cut.
2. Forest soils need to be tested before development projects begin. Non-sustainable uses (cattle ranching on lands that can support grazing for only a short time) should be banned.
3. Developed countries could reduce their demand for paperpulp by at least 25% if paper was recycled.

TROPICAL DEFORESTATION SOLUTIONS:

1. The population explosion in tropical countries is attributing to the problem of tropical deforestation. These governments could establish family planning programs and other relocation programs to stabilize population.
2. The Tropical Agricultural Research and Training Center in Turrialba, Costa Rica was established in 1973 to support countries in Central America and the Caribbean in their agricultural, animal, and forestry development programs.
3. The Tropical Agricultural Research and Training Center, called CATIE, focuses on developing crop, cattle, and forest production systems suitable to the tropics. They have established more than 700 demonstration planting projects.

TROPICAL DEFORESTATION SOLUTIONS:

1. Private reserve systems like the Nature Conservancy established in the United State are currently being set up in Venezuela, Indonesia, and Costa Rica in an effort to save tropical rainforests.
2. Brazil is setting up a vast protected area system. This system includes over 12 million hectares of reserves, parks, hunting areas, game farms, and private reserves.
3. Individuals can write to the Rainforest Action Network at 300 Broadway, Suite 28, San Francisco, CA 94133 to ask how to support rainforest reserves and other preservation projects.

TROPICAL DEFORESTATION SOLUTIONS:

1. Individuals can do the following to help save the tropical forests:
 - Learn about the tropical rainforests
 - Educate others about what is happening to the earth's tropical forests
 - Boycott products that contribute to tropical deforestation
 - Support U.S., international, and private organizations involved in tropical forest conservation
 - Write your congressional representatives and express your concern regarding tropical deforestation

5 Scavenger Hunt

Discovery: A Scavenger Hunt

A Scavenger Hunt is an exciting way to learn about any topic. Designed as a data collecting activity, it is a motivating way to encourage students to collect facts and information from a variety of sources. Many of the items collected or created will encourage students to think more deeply about their topics.

The intent of the Scavenger Hunt is to prepare students for the section on Researching Your Topic. The Scavenger Hunt also provides an abundance of information in a variety of ways—pictorials, maps, graphs, charts, models, dioramas, poems, tee-shirts, brochures, reports, and posters.

The materials gathered during this activity are valuable for the research section. They provide a good resource for quick information when students are problem-solving. Some of the items such as songs, charts, and murals may also be displayed or used in the final presentations on the last day of the Summit. If your Summit is going to be a school-wide or community event, these displays are an excellent way to inform others about the issues your class has studied.

Structuring a Scavenger Hunt

Introduce this activity by asking students if they have ever participated in a scavenger hunt. Explain that they will work together in teams to collect data or create as many of the projects on the Scavenger Hunt list as possible, within a given amount of time. If you would like this to be a competitive activity, the group that collects the most points may be declared the winner.

Divide your class into groups of approximately four students and pass out the Scavenger Hunt list. Tell the class they will have six days to gather information and create their products. On the seventh day, the

points are tallied and the information is shared. It is recommended that some class time be initially provided so that groups may meet and work collectively on their projects.

After handing out the Scavenger Hunt information, give students 15 to 20 minutes to go over the list and plan a strategy. Stress the importance of developing a **TEAM STRATEGY**. Suggest that they decide what steps are needed to successfully complete the task. This might include assigning individual duties, establishing a timeline, and deciding their total point goal. Individual jobs might include record and tally keeper, researcher, artist, etc.

Students may also suggest additional projects, that do not appear on the Scavenger Hunt list. In this case, groups must get your permission and have you assign a point value before adding any new suggestions.

It is helpful to post each group's total point goal. As materials are brought in, they can be listed and tallied. This keeps a running total, provides a convenient way to check progress, and is a great motivator! It also shortens the final tallying process and allows for extra sharing time.

Within two or three days, your classroom may well be overflowing with data in a myriad of forms. Some teachers have used their hallways to display the information, indeed an effective way to share the wealth of facts your students have gathered.

On the seventh day, tally the data and provide class time for sharing the final projects. Point values can be assigned according to the quality of the product. If you deduct points, explain to students why and make suggestions for improvement.

Evaluation of the Activity

After the Scavenger Hunt is completed, pass out the Discovery Evaluation for each student to complete. Allow 10 to 15 minutes for groups to discuss each of the questions, then approximately 15 to 20 minutes for students to complete the evaluation individually.

The Discovery Evaluation responses will indicate the amount of knowledge gained in the hunt and will reveal any further questions the students may have. These questions can be posted and used to initiate the next activity, *Researching Your Topic*.

The Scavenger Hunt and Nothing But the Facts activities will motivate students to begin researching the complex problems associated with their global issue.

This activity was inspired by the "Cultural Studies Series—Teaching About Diversity: Latin America," University of Denver, Center for Teaching International Relations. The program uses a similar process for helping students learn about Latin America.

Tropical Rainforests Discovery: A Scavenger Hunt

Tropical rainforests only cover approximately 8% of the earth's surface, yet half of all plant and animal species grow and live in these forests. A critical problem facing the planet today is the massive tropical deforestation caused by the need for fuelwood, land for cattle ranching, agriculture, settlements, and timber. Tropical forests are being destroyed at a rapid rate. Each year an area the size of Indiana is cleared.

There are many things individuals can do to help decrease the massive destruction of this valuable world resource. One of the most important steps is to learn about the problems and consequences related to the rapid deforestation of our tropical rainforests. The following activity will provide you with a lot of information about deforestation.

Rules for Scavenger Hunt

1. You must work in groups with each member contributing equally to the efforts of the whole group.
2. You can go anywhere to obtain information. Cameras and tape recorders may be used to record information. Written or recorded summaries of television shows and hand drawn maps and diagrams are acceptable.
3. The use of primary resources is emphasized.
4. All sources of data must be recorded.

Items to Collect and Create

1. Find or create a map of the world forests. Indicate where tropical deforestation is occurring. (10 points)
2. Collect or draw five pictures of trees that grow in the tropical

forests. (5 points) BONUS: Add 10 points if you label each tree and include two facts about each.

3. Collect two articles from magazines that discuss the problems of tropical deforestation. (10 points) BONUS: Add 10 points if you include an oral or written summary of the article.

4. Create a graph showing the amount of timber that comes from tropical rainforests in Central and South America. (20 points)

5. Paint a mural displaying products from the tropical forest. (15 points) BONUS: Add 10 points if you include pictures or illustrations.

6. Call Burger King to see if this business has refrained from purchasing beef grown in the tropical forests. Write a paragraph summary of your conversation. (10 points)

7. Perform a skit demonstrating how nutrients are recycled in the tropical rainforest. (10 points) BONUS: Add 15 points if you compare this process to a temperate forest where it takes much longer.

8. Create a timeline that compares the regrowth process of a tropical rainforest to that of a deciduous temperate forest. (15 points)

9. Make a collage showing the global economic significance of the tropical rainforests' products. (10 points)

10. List at least seven organizations that are helping to preserve the tropical rainforests. Include the name and address of each organization and the nature of its efforts. (10 points)

11. Graph the rate of tropical deforestation since 1950. (15 points) BONUS: Add 10 points if you include estimates through the year 2050.

12. Write a poem that tells about the consequences of rapid tropical deforestation. (15 points)

13. Design a poster that informs others about massive tropical deforestation. (15 points)

14. Construct a model of a tropical rainforest. Include labels and/or descriptions that tell about the value of tropical rainforests to everyone on earth. (25 points)
15. Create a NOTHING BUT THE FACTS chart that displays information about where tropical rainforests are being cut down, why they are being destroyed, who is cutting them down, how much is being eliminated, and for what reasons. (25 points)
16. Make-up a rap, song or poem that explains the "greenhouse effect" and the important role tropical rainforests play in reducing air pollution. (25 points)
17. Create a chart that lists the major causes of tropical deforestation. (10 points)
18. Collect and display pictures of animals currently listed as endangered due to tropical deforestation. (15 points)
19. Draw a picture that illustrates the interdependent relationships of plants and animals living in the tropical rainforests. (20 points) BONUS: Add 15 points if you show what happens when a plant or animal species is removed from the ecosystem.
20. Create a mindmap or chart that displays the medical drugs that come from the world's tropical rainforests. (10 points)
21. Make a map or highlight a ready-made one that shows tropical rainforest preserves throughout the world. (15 points) BONUS: Add one point for each time you list the size of the preserve.
22. Write a brief summary of the practice of "agroforestry" and how it is used by some forest-dwelling people. (15 points) BONUS: Add 5 points if you include drawings or pictures of how agroforestry works.
23. Design a pamphlet or brochure that tells people about the problems associated with tropical deforestation and what they can do to help. (25 points)
24. Write a song, ballad, or rap that tells about the value of preserving our tropical rainforests and why everyone must assume responsibility for this invaluable resource. (20 points)

25. Create a skit that portrays the process of photosynthesis. Characters should include water, sunlight, plants, carbon dioxide and any others of your choice. (20 points)
26. Create a TROPICAL RAINFOREST ALPHABET BOOK that tells about tropical rainforests. (25 points)
27. Find out about indigenous people of the rainforests. Learn about their lifestyles and the ways they have learned to live in harmony with the forest. Write a three paragraph explanation of these people. (20 points)
28. Make a collage of products that individuals can refuse to purchase in an attempt to help the rainforests. (10 points)
29. Make a T-shirt design that could be used to inform others about the problem of tropical deforestation. (15 points)
30. Create your own items for the scavenger hunt on tropical deforestation. Get your teacher's approval and together determine the number of points.

Evaluation Sheet for Discovery

NAME: _____ DATE: _____

TEAM MEMBERS: _____

1. What information did you discover that indicates how critical this problem is?

2. What was the most interesting thing you discovered? Why?

3. Can you find two pieces of data that pose contradictory information about this problem? List the sources and the differences discovered and why you think they are in conflict.

4. Which item or activity gave you the most useful information? Why?

5. As a result of this Scavenger Hunt, what new action will you take to better understand and help solve this critical problem?

6. Describe the strategy used by your group to complete the Scavenger Hunt. How did it work? What would you do differently next time?

7. Did you experience any conflict in your group? Describe the conflict and how you did or did not resolve it.

8. What did you like best about this activity?

9. What would you change about this activity?

10. During the past week while working on the Rainforests project I would like to thank _____ for . . .

11. In order to relax right now, I would like to . . .

12. If I were evaluating my Rainforests project work, I would say I have earned _____ because . . .

13. If I were evaluating my group's Rainforests project work, I would say we have earned _____ because . . .

6 Map Activity

Where in the World? A Brief Geography Lesson

This activity will provide students with the opportunity to develop map-reading skills. Each student will need a small map of the world that includes longitude and latitude lines. You should have a large world map to demonstrate your explanations.

First, explain the concepts of longitude and latitude to the students. You might want to share the fact that these imaginary lines enable us to locate any point on earth. Latitude lines run around the world parallel to the equator. The equator has a latitude of 0 degrees. The North Pole has a latitude of 90 degrees north, sometimes shown as +90 degrees. The South Pole has a latitude of 90 degrees south, which is sometimes written -90 degrees. Ask students to locate the equator and the North and South Poles.

Longitude lines run north and south. Most nations count longitude east and west beginning with an imaginary line at Greenwich, England. Greenwich lies at 0 degrees longitude. A place halfway around the world from Greenwich is at 180 degrees longitude. The earth is divided into two hemispheres, each with 180 degrees. Longitude locations west of Greenwich are referred to as west longitude and those east of Greenwich have east longitude locations. Ask students to locate Greenwich and areas east and west of Greenwich as well.

Once students understand the concepts of longitude and latitude, ask them to look at their maps and find the longitude and latitude of major cities such as Los Angeles, New York, Miami, or Seattle. Have them look for a country and give the coordinates which the nation encompasses. When students are able to identify the correct meridians, they are ready to move on to the next activity.

Ask students to individually consider one place in the world where their global problem is especially severe. They could consider cities, countries, oceans, continents, etc. Instruct students that they are not to share with others where their trouble spot is located. When they have decided upon their global problem area, they then need to determine the latitude and longitude of this location. It is now time for geography riddles! Students will, one at a time, tell the class the longitude and latitude degrees of their particular spot. Class members are to locate these meridians on their maps and tell the name of the place. The student who has given the meridian points must validate the responses, and also must share the specific nature of the global problem at that location. You may also ask students to draw or note on their maps information they have learned to date. Additional data can be added as it accumulates.

Where in the World?

A Brief Geography Lesson

This activity will acquaint you with map-reading skills. You will need a small map of the world that includes longitude and latitude meridians.

To read maps, you'll need to understand the concepts of longitude and latitude. These are helpful imaginary lines that enable us to locate any point on earth. Latitude lines run around the world parallel to the equator. The equator has a latitude of 0 degrees. The North Pole has a latitude of 90 degrees north, sometimes shown as +90 degrees. The South Pole has a latitude of 90 degrees south, which is sometimes written -90 degrees. Locate the equator and the North and South Poles on your map.

Longitude lines run north and south. Most nations count longitude east and longitude west, beginning with an imaginary line at Greenwich, England. Greenwich lies at 0 degrees longitude. A place halfway around the world from Greenwich is at 180 degrees longitude. The earth is divided into two hemispheres, each consisting of 180 degrees. Longitude locations west of Greenwich are referred to as west longitude and those east of Greenwich as east longitude. Locate Greenwich on your map. Identify some west and east longitude locations on your map.

To further practice the concepts of longitude and latitude, look at your map and find the longitude and latitude of major cities such as Los Angeles, New York, Miami, or Seattle. Look for a country and give the expanse of latitude and longitude meridians which the nation encompasses.

Next, consider one place in the world where a global problem is especially severe. You may want to consider cities, countries, oceans, continents, etc. Do not share with others where your trouble spot is located. When you have decided upon your global problem area, next determine the latitude and longitude of that location. It is now time for geography riddles! When it is your turn, tell the rest of the class the longitude and latitude degrees of your spot. Your class members are to locate the meridians on their maps and tell the name of the place you have chosen. You will need to validate their responses and also share the nature of the global problem at your location. Enjoy guessing your classmates' riddles as well.

7 Research and Independent Study

Self-Directed Learning: Researching a Global Issue

In the following activity, students have the opportunity to direct their own learning. Students will pursue a topic of personal interest, develop their own approach to research, and create their own project design. The intention of the self-directed activity is to let students assume responsibility for their learning. They will enjoy pursuing a topic of special interest to them while mastering independent learning skills, useful both within the classroom and without.

Students will progress through a five-step process. First, provide students with copies of Steps to Self-Directed Learning and the Independent Project Contract located on the following pages. Introduce each of the steps by having a brief class discussion to clarify and explain what is expected of them and also to address any questions they might have. You may want to brainstorm possibilities for study with the entire class. Students can refer to the list as a starting point when choosing their topics. You may also want students to keep their self-directed learning papers in some sort of file folder. The entire process can span from one to three weeks.

After completion of their independent research and in-class presentations, you may want to suggest that students share their knowledge with other classes, other schools, or create community forums. Or, you and your students may decide to wait for Step 2 of the Summit process to share their research in small groups.

To bring closure to this unit, you might ask your class what they have learned about being a creative and independent learner and how the skills used in this lesson can be applied to "everyday life."

Steps to Self-Directed Learning

Researching a Global Issue:

From your previous activities with the Fact Cards and the Scavenger Hunt, you have acquired a lot of information about your global topic. You will now have the opportunity to select one aspect of this topic that holds special concern for you. What have you encountered so far that was particularly interesting? Is there something more you would like to find out about?

STEP 1

So that you can independently direct your own learning, you will first need to decide upon your topic. Select one aspect of the global problem that intrigues you. You may instantly know what you would like to study or you may want to refer back to the Fact Cards or the Scavenger Hunt for ideas. Once you have determined your area of interest, narrow your topic down so that it is manageable to research. Get your teacher's approval before you begin Step 2.

STEP 2

To complete Step 2, you will need to make decisions about two important aspects of your project. First, determine at least three things that you want to learn. To do this, write your topic down on a piece of paper, then list a minimum of three items you are curious about. Perhaps you will want to answer the questions: **who, what, when, where** and **why** as they relate to the subject. Perhaps you have questions that spring to mind immediately. Once you begin researching, you may change your mind about some of the original questions you listed, or something else may appear intriguing. Do go ahead and pursue your new interests if this should occur. However, it's important to begin your research with a focus.

After you have written what you want to know about your topic, write a paragraph explaining what your final achievement will be. Perhaps you will create a model or a demonstration that will explain your subject. Be creative and develop an end product

that will be fun and interesting for you to do, for example, make a model, write a song, do a collage, or make up a story or skit that includes factual information.

STEP 3

Once you have determined your topic and what you want to learn about it, you need to gather information. Data can come from books, but it can also be found in a variety of other sources. Your research will be enjoyable if you use many different approaches to gathering information. Identify three ways to gather data. You may want to choose from among the following, or create your own suggestions:

- Call a nearby university or other organization to determine if someone there is knowledgeable about your topic. If so, conduct a telephone interview. To do this, you will need to make a list of questions ahead of time so that you are fully prepared before speaking with the expert.
- Use your school or city library. Do not rely strictly on encyclopedias or books. Ask your librarian to help you locate governmental documents, films, videotapes, magazines, and newspapers that may contain information you need.
- Watch for pertinent television or radio shows. Check the educational television station in your area to find out what their programming includes.
- Your teacher can order films and videotapes on your topic from the educational service district nearest your school. You may want to request that either you or your instructor look through the film catalogue to determine what might be of value to your research.
- Conduct a survey at school or in your neighborhood where you ask people pertinent questions. Record their answers on a survey form that you create.

What are other suggestions you might have for finding the information you will need? Write on a piece of paper the three approaches you will use in your data collection.

STEP 4

Now that you have determined your topic and how you'll conduct your research, you are ready to complete an Independent Project Contract. This will provide both you and your teacher with an overview of your entire self-directed learning experience. Please complete the following form and have your teacher initial it. Enjoy learning independently!

Independent Project Contract

Student Name _____

Date _____

Project _____

Title _____

Planned Completion Date _____

Three items you will learn about your topic:

1.

2.

3.

Three information sources you will use:

1.

2.

3.

Final Product:

Project Timeline: List what you will accomplish and when:

Presentation: Describe what you will share with the rest of the class and when you will do the sharing:

Teacher initial: _____

Project Evaluation

1. Used a variety of different information sources:

1	2	3	4	5
One information source				Five or more information sources

Comments:

2. Completed project according to the project timeline:

1	2	3	4	5
Project not on target				Completed

Comments:

3. Showed effort:

1	2	3	4	5
No effort				Excellent effort

Comments:

4. Creativity:

A. Fluency (number of ideas)	1	2	3	4	5
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B. Flexibility (different ways of sharing ideas)	1	2	3	4	5
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C. Originality (uniqueness)	1	2	3	4	5
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D. Elaboration (development of ideas)	1	2	3	4	5
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Comments:

5. Other Comments:

8 Youth Summit

Overview of a Youth Summit

Once students have completed their research, they are ready to begin the Summit process. The Summit uses a problem-solving approach that encourages the use of creative and critical thinking skills. The particular model outlined for the Summit process is a synthesis of the work of E. Paul Torrance, Alex Osborne, and Bob Stanish. Some aspects have been adapted to fit the needs of the Summit.

The Summit is designed to encourage students to take action. It also serves to alleviate any frustration, anxiety, and/or fear that may have built up as a result of the in-depth research done in the previous activities.

By going through the Summit process, students will develop the skills inherent to effective problem solving. The process stretches students to engage in higher cognitive functioning, to learn to work effectively in groups, and to improve their communication and writing skills. Most important, it moves students from the level of theory to the level of practical application.

Structuring a Youth Summit:

Time

The entire process, including the final presentations, will take approximately 8 to 12 hours. This can be structured as a Summit or it can be extended over a week-long period. We recommend a two- to three-day Summit to focus student interests and to provide uninterrupted time for concentrated exploration. However, this is not always

possible. Conducting the Summit over a one-week period can work well, especially if you provide time to review the previous day's work and facilitate closure at the end of each working period.

Materials

We recommend that each student be provided with a copy of the Summit Journal. This outlines the problem-solving process and provides a place for your class to record their efforts. This becomes a valuable evaluation tool and should be checked at various intervals throughout the Summit. Additional materials include butcher paper and colored marking pens. Art supplies and reference materials should also be available.

Establishing Problem-Solving Groups

We recommend groups of four to five students. If cooperative learning is new to your students, you might consider setting up groups of three. The grouping works best if it is heterogeneous in terms of ability and talents. You may want to have students work in the same groups as were arranged for the Scavenger Hunt activity.

Work/Display Area

If you are holding the Summit in your classroom, establish work/display areas for each group. Tables work best; however, desks can be put in a circle or square. If possible, provide wall and counter space so that students may display the information gathered during the Scavenger Hunt and Self-Directed Learning. Students will also be displaying information generated during the problem-solving process. You may want to establish one main resource area where books, pamphlets, posters, and articles may be stored for easy access throughout the Summit.

Problem-Solving Process

You will want to familiarize students with the problem-solving process before the Summit. See the next section, *Facilitator's Guide*, for more detailed information. For easy reference, we have included an agenda with approximate times.

Introduce each step to the entire class, and then have the students begin the process. Establish a time limit, then add more time if needed. Some groups may work through the process faster than others. You can give them instructions for going on to the next step.

As students work through the process, move from one group to the next to observe interaction. Clarify the process when necessary, help resolve group conflicts if they arise, and provide needed information or directions for finding it.

Preparing Presentations

At the onset of the Summit, explain to students that each group will be responsible for planning a 10- to 15-minute presentation for the class. This presentation will focus on informing others of the problem they have worked on and their proposed solutions. Students should start thinking about this at the onset. They are encouraged to be creative in the manner with which they present their material. Encourage them to use charts, graphs, illustrations, pictures, skits, poems, songs, dances, or stories to teach the others. They might also consider ways to get their classmates involved in helping them carry out their solutions.

At the conclusion of each presentation, allow time for questions or suggestions from the audience. This period can take up to three hours depending upon the number of groups sharing and the length of the presentations. Group presentations often range from five to twenty minutes.

You may also decide that your students should share their work with other classrooms, schools, parents, and/or community members. To manage this step, ask students to submit an outline of their project for your approval. Also, students will need time to rehearse. Much of the materials produced during the Scavenger Hunt can serve as visual

displays; however, some groups may need additional time to develop props, costumes, charts, and hand-outs.

Taking Action

This is the most exciting part of the process. Here students take action and begin effecting change. It may be necessary to set aside time each week for students to work on their action plans. There are a myriad of possibilities for taking action and you may find your class involved in creating a game, making a film, writing a book, starting a newsletter, raising money for a project, conducting research, getting signatures for a petition, surveying the community, or making public service announcements for a local television station, to name a few of the possible outcomes.

NOTE: The processes and times shown on the following page are merely suggestions. You are encouraged to make adaptations to fit your needs and classroom situations.

Our Only Earth

Youth Summit Agenda

(Suggested Times)

STEP 1 — Introduction/Problem Exploration
(30 minutes)

STEP 2 — Sharing Research (1 - 1.5 hours)

STEP 3 — Brainstorming Problems (30 minutes
to one hour)

STEP 4 — Brainstorming Solutions (30 minutes
to one hour)

STEP 5 — Evaluating Solutions (1 - 1.5 hours)

STEP 6 — Carrying Out Solutions (1 - 1.5 hours)

STEP 7 — Presenting Solutions (1 - 3 hours)

Facilitator's Guide: Youth Summit Process

STEP 1—Introduction/ Problem Exploration

GOAL: To share feelings, thoughts, and ideas surrounding the global issue.

OBJECTIVES: To communicate feelings, thoughts, and ideas concerning the issues surrounding the problem.

TIME: Approximately 30 minutes.

PROCESS: Begin by introducing the problem-solving process to be used throughout the Summit. It is helpful to go over each of the seven steps. Students can follow along in their Summit Journal, which serves as a guide as well as a place to record their progress. These journals are also helpful in evaluating students' work.

(OPTIONAL): Depending upon the age and experience of your class, you may want to practice the problem-solving process with a problem that students are currently trying to resolve, i.e., improving grades or saving money. This trial run will familiarize students with the key components of effective problem-solving and usually takes about one hour of class time.

No matter how you introduce the problem-solving process, emphasize the need for students to work together in a cooperative and collaborative manner. For information on implementing cooperative learning

in the classroom, refer to the work of Roger T. Johnson and David W. Johnson. Their books are helpful in structuring cooperative learning in the classroom: *Learning Together and Alone, Circles of Learning*.

Once students are familiar with the Summit process, initiate Step 1 by having them record their individual reflections on their particular global issue. Ask them to write in their Journals any feelings, thoughts, ideas, images, and/or fears about this issue.

After students have an opportunity to reflect, allow time for sharing with members in their groups. You may also want to provide time for a classroom discussion. If so, have each group choose someone to summarize their discussion for the benefit of the whole group. Remind students that each time information is shared with the whole group, a new spokesperson will be selected. Encourage students to record any new bits of information, key ideas, or insights that emerge during the sharing.

STEP 2—Sharing Research

GOAL: To learn from others about the issue.

OBJECTIVES:

- Share research information.
- Categorize key ideas generated by the group.
- List any unanswered questions.
- Develop strategies for discovering answers to any unanswered questions.

TIME: 1 - 1.5 hours.

PROCESS: In this step, students share their independent research, completed in the previous activity (self-directed learning), with members of their problem-solving groups. After the presentations and sharing of research, have students categorize key ideas and information on a Data Retrieval Chart. An example is given below. Have students make their own chart on a large piece of butcher paper. This information can be posted in the group's work area.

Sample Data Retrieval Chart

Name	Who	What	When	Where	Why

To complete the Data Retrieval Chart, each student summarizes and inserts the information in the appropriate categories. They begin by each placing their name in the correct column and then completing one horizontal section of the chart. Each student, then, should contribute a who, what, when, where, and why fact to the chart. The completed chart organizes and categorizes facts and information for easy reference during the Summit process.

Once students have shared their Independent Research Projects and have filled out the Data Retrieval Chart, you may want to allow time for each of the problem-solving groups to share their data and information with the entire class. Have problem-solving groups designate a NEW spokesperson.

As each group reports information, ask the other groups to indicate if they have listed similar information. If so, they should mark this information so that it is not repeated again, but simply acknowledged. Groups are encouraged to add to their Data Retrieval Charts as new information emerges.

An additional use for the Data Retrieval Chart is to have students consider their global issue from diverse viewpoints. Students can first suggest a variety of individuals or organizations involved in their issue. For example, one issue might be the destruction and burning of tropical rainforests for cattle. Some of the people involved in this issue would be owners of fast food restaurants who depend on rainforest beef, the Minister of Finance of the country where the destruction is happening, indigenous people who make their home in the rainforest, environmental groups such as Greenpeace or Rainforest Action Network, biologists, and the president of a Multilateral Development Bank. Each student could think of one group to list under the "name" section of the grid. Students can then add each group's perspective as they complete the who, what, when, where, why portions of the chart. Discussion can follow the sharing of the new perspectives involved. Point out to the students that there are always two or more sides to each issue.

STEP 3—Brainstorming Problems

GOAL: To brainstorm problems related to the issue.

OBJECTIVE:

- Identify specific problems by brainstorming sub-problems and contingent problems related to the situation.
- View the problems from a variety of perspectives.
- Choose a problem to solve.
- Define the problem.

TIME: Approximately 30 minutes to one hour.

PROCESS: Identifying the problems related to this global issue is one of the most important steps of the creative problem-solving process. Defining the problem properly will determine the quality and appropriateness of the students' solutions.

Introduce this step by emphasizing the importance of problem identification. Remind students that in identifying problems associated with this issue, it is important to view the problem from all angles. It is helpful to think about how people, nations, plants and animals are affected by this issue. Ask students to consider issues from different points of view.

Next, ask small groups to think about all of the problems related to the issue. Familiarize students with the rules of brainstorming, stressing the importance of withholding judgement, "piggybacking" on others' ideas, and freewheeling. Allow the groups approximately 15 to 20 minutes to brainstorm.

Afterwards, suggest that groups review the list of problems they generated. At this point, some problems may be combined or elaborated, as well as new ones listed.

Allow time for small groups to decide which of the listed problems they are most interested in solving. Once each group has chosen a problem, they are ready to move on to problem definition.

To define the problem, students need to think of different ways to state the problem. It is sometimes easier to generate solutions when the

problem is posed as a question rather than a statement. Ask students to think carefully about the verb they use in their definition. A strong verb will focus their energies. An example might be: How can we save precious acreage of tropical rainforest in the Amazon Basin? Or: In what ways might we educate our community about how important tropical rainforests are to people living in the Northern Hemisphere in an effort to elicit community support for saving the tropical rainforests. Have students experiment with the use of different verbs when selecting their questions and ask them to answer the questions in this section of their Summit Journal. They will undoubtedly note that as they change their definition, the focus for solutions will also change.

As each group defines their problem, move about from group to group, checking for strong verb usage and making sure they are on the right track.

Once students have completed the task, allow time for reviewing information and facts, keeping in mind the specific problem they have chosen. New questions may arise, and students may find they need more information before they can generate solutions. If so, groups should plan a strategy for gathering new information. Depending on how many groups need to do more research, you may want to allow additional classroom time or have students complete the research as homework.

STEP 4—Brainstorming Solutions

GOAL: To brainstorm creative solutions to the problem.

OBJECTIVES:

- Apply the brainstorming process for generating solutions.
- Generate many ideas, simple or complex.

TIME: Approximately 30 minutes to one hour.

PROCESS: Provide problem-solving groups with approximately 20 minutes to discuss possible solutions. Remind students that the goal of brainstorming is to generate as many ideas as possible. Emphasize the importance of withholding judgment while deliberating. For now, they can let their creativity soar; wild and crazy ideas are acceptable. One of those ideas, after a little revision, just might be the solution they are looking for. Remind students not to overlook simple ideas; solutions can range from simple to complex, and sometimes the simplest solutions are the best! Encourage students to combine solutions or add onto the ideas of others.

As students come up with ideas, have them say their plans aloud while at the same time writing them down on scrap paper. Place all pieces of paper in the center of the group, to use in Step 5. Students may also want to record their ideas in their Summit Journals. Allow additional time if groups are still brainstorming after 20 minutes.

STEP 5—Evaluating Solutions

GOAL: To decide which solutions might be the best for solving the stated problem.

OBJECTIVE:

- Decide on the top two ideas.
- Evaluate possible positive and negative outcomes.
- Evaluate possible long- and short-term consequences.
- Evaluate solutions and make a final determination regarding the "best" solution.

TIME: 1 - 1.5 hours.

PROCESS: Provide small groups with about 10 minutes to decide on the top two solutions. These solutions should be listed in order on the Evaluation Grid located in their Summit Journal and shown below.

Youth Summit Solution Evaluation Process

SOLUTIONS: Rank in order your top 2 solutions and list	POSITIVE OUTCOMES + List 3 positive outcomes for each solution	NEGATIVE OUTCOMES - List 3 negative outcomes for each solution	POSSIBLE SHORT- & LONG-TERM CONSEQUENCES: List the consequences that might result from the implementation of your solutions in a 1-, 5-, 10-, and 20-year time frame. Put a + or - by each consequence to signify whether it is positive or negative.			
SOLUTION #1:			1 YEAR	5 YEARS	10 YEARS	20 YEARS
SOLUTION #2:						

GROUP TOPIC:

GROUP MEMBERS:

SPECIFIC GROUP CHALLENGE:

Once the top solutions have been selected, students begin the evaluation process. For each solution listed, students will go through the following three steps:

- **POSITIVE OUTCOMES** — Students list four or five of the possible positive outcomes. Positive outcomes should be considered from various points of view.
- **NEGATIVE OUTCOMES** — Students list four or five of the possible negative outcomes. This can be looked at from the different points of view examined in step one if applicable.
- **POSSIBLE SHORT & LONG TERM CONSEQUENCES**— In this step, students forecast the possible consequences that might result from the implementation of their solutions over a 1-, 5-, 10-, and 20-year time frame. For each consequence, students should put a + or - to signify a positive or negative consequence.

Once students have completed the evaluation process, have problem-solving groups decide which is the best solution in light of the positive and negative outcomes, including the possible short- and long-term consequences.

Suggest that small groups discuss their final solution. Encourage them to ask if the solution clearly reflects the thinking of the entire group. Changes might also now become apparent. Students may need to modify their solutions based upon the possible outcomes and consequences. Have students answer the questions on *Modifying Your Solution* in their Summit Journals.

STEP 6—Carrying Out Solutions

GOAL: To develop an action plan for carrying out the solution.

OBJECTIVES:

- Brainstorm different ways to carry out the solution.
- Create a step-by-step plan for carrying out the solution.
- Brainstorm ways to inform others about this problem and suggested solutions.

TIME: 1 - 1.5 hours.

PROCESS: Thomas Edison once said that creative work is "... one percent inspiration and ninety-nine percent perspiration." Remind students that this is the most important part of their work. Here, their creativity will be taxed as they discover ways to carry out their solutions. While this step demands much work, it is also the most gratifying part of the process since students become empowered to take action.

Remind students that a good part of their efforts will include informing people about the problem and their proposed solutions. This can be done through a variety of ways including songs, artwork, poems, stories, plays, newspaper articles, petitions, letter writing, and editorials.

This is also the time when students generate various ways to apply their theories. These might include a letter-writing campaign, adopting a concern, or developing an organization that informs other youth about this problem and what they can do.

Fund raising is another possible project. The funds can even be used to support students' projects and concerns. It's an excellent way to inform others as well as a practical way for students to see their work in action. You might want to spend time brainstorming possible fund raising options as a whole group. Suggestions include: raffles, selling students' art work, information booths at local and community events, car washes, and/or bake sales.

At past Summits, students have generated a wide variety of projects. These include: making a game about the effects of plastics on the

environment, writing a book about the issues surrounding tropical deforestation with solutions from students around the world, creating a worldwide network of youth interested in working together to save the tropical rainforests, writing letters to congressmen, setting up a booth at a local carnival to inform individuals about the ocean crisis, creating a public service announcement, and making short films to inform people about wildlife's struggle to survive.

Once small groups have their ideas, allow 20 to 30 minutes for developing their Group/Individual Action Plans. These are included in the Summit Journals and should be completed by each student. These action plans require students to list each of the steps they need to take in order to carry out their solutions, as well as to identify the person responsible for each part of the action plan. Students will also create a timeline to indicate when they anticipate the completion of each step. Finally, students are able to reflect on what the end results of their efforts might be. This is cause for celebration!

Examples of the forms that the students will complete for Step 6 follow on the next two pages:

Action Planning

You will now need to organize how to carry out your group's solution. Each of you will have individual tasks to complete. On the form below, write down your group action plan.

Youth Summit Group Action Plan Form

Group Topic: _____

Group Members: (Please list first and last names.)

Describe the specific problem your group decided to solve:

List your best solution:

List the specific steps your group will take to carry out the solution, beginning with what you will do **first, second, third**, and so on. Also list the name of the group member who will be responsible for doing each step:

Create a timeline stating dates of completion for the steps listed above:

Describe the end result of your efforts. What exactly will you have accomplished?

Individual Commitment

On the following form, state the responsibilities you took on as part of your personal contribution toward solving a global problem.

Youth Summit Statement of Individual Commitment to Work on an Area of Global Concern

Name: _____

Area of Global Concern:

List the commitments you made to your group at the Summit:

Please describe below any additional commitments you would like to make and pursue independently:

Signature: _____ Date: _____

Thank you for your efforts to make the world a better place!

STEP 7—Presenting Solutions

GOAL: To develop presentations that inform others about the issue and the plan of action.

OBJECTIVES:

- Suggest various ways to present information and solutions.
- Teach at least 10 facts to the audience.
- Actively engage the audience in learning about the issue and in taking action.

TIME: 1 - 3 hours.

PROCESS: Allow time for students to present information about the problem and their solutions to the class. Students might use some of the products from the Scavenger Hunt or Independent Research to teach others about the problem. Encourage the use of charts, diagrams and illustrations. Poetry, songs, raps, or skits can also be a great way to inform others. Emphasize the need to develop dynamic and interesting presentations that encourage audience participation.

To help the students prepare a presentation, the following three steps are included in their Summit Journals:

Step 1: Determine how you will inform the audience about your group's specific problem. What will you say or do to begin your presentation and how will you explain the issue you have addressed?

Step 2: Outline below how you plan to describe your solution and action plan to the audience. Select at least two of the strategies listed below to include in your presentation.

Presentation Strategies:

charts, graphs, tables	data sheets
posters	booklets, pamphlets, handouts
illustrations, photographs	overhead transparencies
cartoons	slides, video, music
poems, songs, raps	audience participation
skits, plays, simulations	

Outline of your solution and action plan:

Step 3: If appropriate, how can your group engage the support of the audience in implementing your solution? List ways that your group could involve community members, business and industry, local schools, parents, and organizations that might give support. Prepare to share this as part of your presentation.

After the students have prepared their presentations, they may want to go "on the road" with them. Exhibits can be set up in the school or public library so other students can see them. Talk to your principal about holding a school-wide assembly. There may be other students who want to get involved in the activities. A Parent Night or Community Night could be set up to inform others, not only about the issues, but also about what students have been doing to resolve them.

In Conclusion:

The actual implementation of solutions may be a year long, or longer, process for some of your students. You may find that your class will be involved throughout the school year. You may wonder how you could possibly take any more classroom time for this issue. However, many of the activities can be integrated with other areas. For example, writing will undoubtedly be an activity that all groups will participate in. Public speaking can also be incorporated into the solution-finding process. Students may get involved with state lawmakers and learn about the legislative process or they may conduct scientific research through local zoos, water protection agencies, or universities. Posters and art work might be developed as a visual means of communicating information. Likewise, students may want to write a song, perform a play or choreograph a dance relating to their topic. They may also wish to survey pertinent people or obtain feedback on their proposed solutions.

The possibilities for integrating this material into all content areas are limitless. But more importantly, we have found that through this "real life" content and the process of problem-solving and actually implementing solutions, students become highly motivated toward learning in general. In addition, students are more creative and willing to take risks. Even the unmotivated learner begins to shine as he/she is able to independently take responsibility for learning. Parents report that their children have begun reading newspapers and watching educational television. Students become more involved in school, in the community, and in the world. And most importantly, they recognize their place as caretakers of one another and of the planet.

It is imperative that the next generation have the skill and ability to effectively deal with the global challenges that will face them. The purpose of this series is to instill in students an awareness of the importance of taking action that will have a long-term, beneficial effect on the entire planet. As problems become more and more common, it is hoped that the next generation will have the sensitivity, the skills, and the desire to solve them. Our future, and our children's future, truly depend on what happens today.

Our Only Earth

SUMMIT JOURNAL

The Future of Our Tropical Rainforests



Introduction

A creative problem-solving process will be used to structure your efforts towards finding and then implementing solutions to your global challenge. This process provides a way to capture your dreams and hopes by putting them in a practical form that enables you to make positive contributions to your community and the world community, today and in the future.

STEP 1—Problem Exploration

Reflect for a moment on the many things you have learned about your global issue. Also reflect on how that information made you feel. Did you feel frightened or overwhelmed from the scope of the problem? Do you have concern for the well-being of others? In the space provided below, write down your feelings and thoughts about this issue. Include images, ideas, fears, or anything else associated with the problem.

In small groups, discuss your feelings and thoughts surrounding this issue. Note how your feelings are similar to, or different from, other members' in the group. Be prepared to summarize your group discussion for the benefit of the whole class. Choose a spokesperson.

Record the key ideas of your group on the back of this page or on a new sheet of paper. During the discussion, add any new bits of information to your list.

STEP 2—Sharing Research

Each group member will be asked to describe to the others his/her independent research project. Use the Data Retrieval Chart (see sample below) to categorize the information you have learned as a result of the presentations. Each member's name should be listed in the Name column, and then for each person the **who, what, when, where** and **why** facts from their work. Also keep records of any new questions that come up. Discuss ways to find the answers and assign responsibilities. Choose a new spokesperson to present your Data Retrieval Chart to the entire class.

DATA RETRIEVAL CHART

Name	Who	What	When	Where	Why

STEP 3—Brainstorming Problems

Step 3 has two aspects: the first is to identify the many problems associated with your issue and the second is to define the specific problem which your group decides to address. By identifying the problems surrounding the issue, the proper definition can be determined, which influences the quality and appropriateness of your solutions.

In your group, brainstorm the problems related to your global issue. List your ideas below.

Now go back and review your list. What problems go together? Cross out any problems that are repeated. Add new ones that may come up as you review the list. As a group, decide which problem to solve.

BRAINSTORMING PROBLEMS (con't)

Problem Definition

One of the ways to clarify a problem is to phrase it as a question. Restating your problem as a question will make it clear and definite. This will also direct you to possible solutions. For example, if your issue is the disposal of waste products in your city, several questions could be formulated, such as:

- How can we educate our community about its waste disposal problem?
- In what ways could we reduce the amount of waste our community generates?
- How can we limit the amount of disposable products used in our community?
- What kind of recycling program could we create locally?

There could be many other questions as well. As you can see by restating your problem as a question, the focus becomes more clear and you may be better prepared to seek answers. These answers will later suggest solutions which will lead you to a specific group project. For now, however, the task is to take your issue and turn it into a question. On the space provided below, write your group's issue:

Working individually, take a couple of minutes to come up with two or three possible questions. You will want to include a strong action-oriented word in each of your questions such as any of the following:

educate
limit
decrease

reduce
inform
involve

enhance
promote
publicize

Write two or three questions that restate your issue on the following lines. Choose one of the action words above, or better yet, generate some of your own for each question you create. Circle the strong action word in each question:

1. _____

2. _____

3. _____

Next, share the questions with your group. Choose one which is most fitting and write it below:

Problem Question: _____

Before beginning STEP 4 — Brainstorming Solutions, review the information you have gathered. Determine what new information you might need in order to solve this particular problem.

STEP 4—Brainstorming Solutions

List the solutions generated by your group discussion in the space below:

STEP 5—Evaluating Solutions

In this step, you decide which solutions might be most appropriate for solving the problem. To evaluate your solutions use the EVALUATION PROCESS FORM located on the next page. Decide on the top two solutions. Once you have used the EVALUATION GRID to determine your best solutions, discuss your results with the group to make sure that everyone agrees that this is the best solution.

Youth Summit Solution Evaluation Process

SOLUTIONS: Rank in order your top 2 solutions and list	POSITIVE OUTCOMES + List 3 positive outcomes for each solution	NEGATIVE OUTCOMES - List 3 negative outcomes for each solution	POSSIBLE SHORT- & LONG-TERM CONSEQUENCES: List the consequences that might result from the implementation of your solutions in a 1-, 5-, 10-, and 20-year time frame. Put a + or - by each consequence to signify whether it is positive or negative.			
SOLUTION #1:			1 YEAR	5 YEARS	10 YEARS	20 YEARS
SOLUTION #2:						

GROUP TOPIC:

GROUP MEMBERS:

SPECIFIC GROUP CHALLENGE:

Modifying Solutions

Once your group has determined the best solution to your issue, some modifications may be necessary. You may need to adjust your solution so that potential negative outcomes can be limited. To decide if you need to adjust your solution, answer the following questions:

1. What were some negative outcomes that could result from implementing your solution?

2. How could you avoid these negative possibilities?

3. Were there any possible negative short or long term consequences? If so, list these below.

4. Based upon the information to the above questions, how could you adjust your solution to minimize potential negative outcomes or consequences?

5. Write out your modified solution in the space provided below:

Congratulations! You should now have a well thought out solution to your group's selected problem.

STEP 6—Action Planning

You will now need to organize how to carry out your group's solution. Each of you will have individual tasks to complete. On the form below, write down your group action plan.

Youth Summit Group Action Plan Form

Group Topic: _____

Group Members: (Please list first and last names.)

Describe the specific problem your group decided to solve:

List your best solution:

List the specific steps your group will take to carry out the solution, beginning with what you will do **first, second, third**, and so on. Also list the name of the group member who will be responsible for doing each step:

Create a timeline stating dates of completion for the steps listed above:

Describe the end result of your efforts. What exactly will you have accomplished?

Individual Commitment

On the following form, state the responsibilities you took on as part of your personal contribution toward solving a global problem.

Youth Summit Statement of Individual Commitment to Work on an Area of Global Concern

Name: _____

Area of Global Concern:

List the commitments you made to your group at the Summit:

Please describe below any additional commitments you would like to make and pursue independently:

Signature: _____ Date: _____

Thank you for your efforts to make the world a better place!

STEP 7—Presenting Group Solutions

Now that your group has determined a solution and an action plan, the next step in the Youth Summit process is to develop a presentation to inform others of your efforts. Your group should create a 5- to 15-minute presentation. To help organize your ideas, follow the steps below:

Step 1: Determine how you will inform the audience about your group's specific problem. What will you say or do to begin your presentation and how will you explain the issue?

Step 2: Outline below how you plan to describe your solution and action plan to the audience. Select at least two of the strategies listed below to include in your presentation.

Presentation Strategies:

charts, graphs, tables	data sheets
posters	booklets, pamphlets, handouts
illustrations, photographs	overhead transparencies
cartoons	slides, video, music
poems, songs, raps	audience participation
skits, plays, simulations	

Outline of your solution and the action plan portion of your presentation:

Step 3: If appropriate, how can your group engage the support of the audience in implementing your solution? List ways that your group could involve community members, business and industry, local schools, parents and organizations who might give support. Prepare to share this as part of your presentation.

Summit Notes

Use this space to record information presented by the other groups. Be ready to write down what you can do to help solve the various problems presented.

Glossary

agroforestry: a land-use system in which trees and crops are grown alongside each other, which maintains the forest as a self-renewing resource.

canopy: the branches and leaves of the trees form this uppermost layer found in tropical forests.

carbon dioxide: a heavy, colorless gas that is formed by the combustion and decomposition of organic substances. Carbon dioxide is absorbed from the air by plants in photosynthesis.

conservation: protection of natural resources from waste or loss or harm.

deciduous: trees that shed their leaves every season, like the maple tree.

decomposer: organisms that break down dead plant and animal material to be recycled and used by the living.

deforestation: the process of clearing forests through cutting or burning.

ecosystem: a community and its environment that functions as an ecological unit in nature.

forestry: the scientific process for managing forests.

fossil fuels: substances such as coal, oil, wood and gas that are used to make energy.

gene pool: the total genetic information for the gametes of all individuals of a given population.

global: a term referring to the entire earth; worldwide.

greenhouse effect: a naturally occurring phenomenon where the atmosphere of the Earth traps heat from the sun, like the glass roof of a greenhouse. The atmosphere lets sunlight through to warm the surface of the Earth, but the heat that is created can not easily pass back through the atmosphere into space. This warming of the Earth allows life to exist. Scientists are predicting that the greenhouse effect is increasing due to human activities and that global temperatures may change dramatically.

greenhouse gases: gases including carbon dioxide, methane, nitrous oxide, chlorofluorocarbons and ozone gases that are increasing the greenhouse effect.

hectare: approximately 2.47 acres.

humus: the decomposition of plant and animal matter that forms the organic portion of the soil.

Indigenous: growing or living naturally in a particular region or environment.

Multilateral Development Banks (MDB'S): banks that loan about \$22 billion dollars per year for Third World development, including large scale agricultural projects and cattle ranching. This is an effort to provide Third World countries with export products to generate money for foreign debts.

multiple use management: managing forests for different uses such as mining, logging, watershed maintenance, etc.

organic: of plant or animal origin.

parasite: an organism dependent upon another living organism for support or existence.

photosynthesis: a process in which plants convert carbon dioxide into water and sugar.

predator: an animal that lives by preying upon others.

shifting cultivation: when farmers clear a small plot, grow crops for a short period, then move onto a new site.

soil erosion: the washing away of soil by wind and water due to the lack of protection for the thin layer of top soil.

temperate: having a moderate climate.

temperate zone: the area between the Tropic of Cancer and the Arctic Circle, or the area between the Tropic of Capricorn and the Antarctic Circle.

topsoil: the surface soil including the organic layer where plants have most of their roots.

understory: growing under the canopy, this layer is comprised of shrubs and young trees.

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Vanishing Rain Forests, World Wildlife Fund, 1250 24th St. N.W., Washington, DC 20037.

Rainforest Action Network, 466 Green Street, San Francisco, CA 94133.

Global Tomorrow Coalition, Amy Holm, GTC-West, P.O. Box 15264, Portland, OR 97214.

Greenpeace USA, 1436 U Street, Washington, DC 20009

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About the Authors:

Micki McKisson has an extensive background in education. She has been a classroom teacher, and an educational consultant for many years, a workshop facilitator and adjunct professor for Seattle Pacific University.

Micki has experience in coordinating and teaching a variety of educational programs involving U.S. and Brazilian students in Rio de Janeiro; working with youth at risk during five years of summer programs; and, for six years, teaching in the Gifted Education Program in Issaquah school district.

Currently, Micki works with Greenpeace International as North American Project Coordinator for the East/West Educational Project. She is also responsible for field-testing the Greenpeace curriculum in North America, Europe and the Soviet Union.

Micki has a BA in Psychology and an MA in Systems Design-Education. Her previous book is titled *Chrysalis: Nurturing Creative and Independent Thought in Children*.



Linda MacRae-Campbell has a long and impressive track record in the field of education. For fifteen years, Linda taught grades K-12, and during that time was a three-time winner of the Teacher of the Year Award.

Her experience in education ranges from classroom teaching to such accomplishments as directing gifted, special ed. and arts programs for children; consulting for a variety of educational institutions; training teachers world wide and directing an international educational network in Seattle called New Horizons for Learning.

Linda is a nationally recognized expert in innovative educational research; she has given over one hundred presentations in the last three years.

Presently, she spends time, in addition to pursuing a doctorate in education, as coordinator of a new model of teacher certification for Antioch University in Seattle, Washington.



Together, Micki and Linda have developed and conducted the world's first Youth Summit in Moscow, where 200 Soviet and American youths worked together writing the Youth Declaration for the Future. They have also collaborated on teacher education programs for educators in Guatemala.

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